

REMARKS

Upon entry of the claim amendments presented herein, claims 1, 5, and 10-14 are pending in the application. Claim 6 has been cancelled. Claims 1, 5, 10, 12 and 14 have been amended. Support for the amendments can be found in the specification, claims, and Figures. No new matter has been added.

The presentation of the foregoing amendments should in no way be construed as an acquiescence to any rejections, and is done solely to point out more particularly and distinctly claim the subject matter that Applicants believe to be their invention, and to expedite prosecution. Applicants reserve the right to pursue the claims as previously presented in this or a separate application(s).

The Office Action

Applicants note with appreciation the Examiner's careful consideration of Applicants' previous response in connection with this application, and the withdrawal of certain grounds of rejection previously made. Applicants request reconsideration and withdrawal of the remaining grounds of rejection in view of the amendments and remarks presented herein.

The Invention

The present invention provides optical data recording media which are resistant to deformation (e.g., warp) due to changes in humidity levels. Thus, the present invention provides optical data recording media which are resistant to warpage or deformation induced by changes in relative humidity. More particularly, the present invention provides optical data recording media in which the expansion coefficient under humidity of the protective film and the transparent substrate are regulated to prevent a bending force that can induce a warp or bend in the medium.

For example, as recited in claim 1 (as amended), in one embodiment an optical data recording medium includes a three-layered structure, including a transparent substrate made of a polycarbonate, a thin film layer formed on the transparent substrate and a protective film which is made of an ultraviolet light curing resin and formed on the thin film layer for protecting the thin film layer. According to the invention, warping of the medium due to changes in humidity is suppressed by reciting a relationship between the expansion coefficient under humidity of the protective film, and the expansion coefficient under humidity of the transparent substrate. By balancing the bending moments of the transparent substrate and the protective layer, warping due to changes in humidity is suppressed. In this embodiment, an expansion coefficient under humidity of the protective film is greater than that of the transparent substrate, and is smaller than 5.5×10^{-5} (1%).

In another embodiment, as recited in claim 12 (as amended), an optical data recording medium includes a transparent substrate made of a polycarbonate, a thin film layer formed on the transparent substrate and a protective film made of an ultraviolet light curing resin and formed on the thin film layer for protecting the thin film layer. In this embodiment, the expansion coefficient under humidity, Young's modulus and thickness of the protective film are suitably adjusted so that the bending moments of the transparent substrate and the protective film generated by change in humidity are balanced with a neutral plane being a plane perpendicular to the film thickness direction and the position of the neutral plane is arranged within the thin film layer.

In still another embodiment, as recited in claim 14 (as amended), an optical data recording medium consists essentially of a transparent substrate made of a polycarbonate, a thin film layer formed on the transparent substrate and a protective film made of an ultraviolet light curing resin and formed on the thin film layer for protecting the thin film layer. In this embodiment, the expansion coefficient under humidity of the protective film is greater than that of the transparent substrate and smaller than 5.5×10^{-5} (1%) and the thickness of the protective film is 5 μm to 20 μm .

The Tajima Reference

The referenced cited by the Examiner (Tajima JP 2000-311381, the “Tajima reference”) is directed to optical recording media in which the warpage caused by temperature changes is reduced (see, e.g., the Abstract).

At paragraphs [0035]-[0041], the Tajima reference discloses an example of an optical information recording medium made of three layers (a transparent substrate, a thin film layer, and a thin film protective coating). In this medium, the linear expansion coefficients and thicknesses of the transparent substrate and the thin film protective coat are adjusted to reduce the warp of the medium caused by temperature change.

In paragraph [0024], the Tajima reference describes that due to the linear expansion coefficients of the transparent substrate and the thin film protective coating being greater than the linear expansion coefficient of the thin film layer, and because the thickness of the transparent layer is greater than the thickness of the thin film layer, the medium is warped in a direction toward the thin film protective coating defined as the plus (+) direction as the temperature changes.

Paragraphs [0049]-[0053] and Fig. 5 of the Tajima reference refer to Example 3 in which the medium further includes a substrate protective coating for reduction in an overshoot in the humidity change. In this medium, the moisture vapor transmissions of the substrate protective coating and the thin film protective coating are adjusted. Figure 5 of the Tajima reference shows that the medium of Example is warped in a direction toward the transparent substrate defined as a minus(-) direction after the passage of a predetermined time.

From the above, it can be seen that the medium of the Tajima reference is warped in the direction *towards the thin film protective coat* defined as the plus (+) direction as the *temperature* changes, while it is warped in the direction *towards the transparent substrate* defined as a minus (-) direction after the passage of a predetermined time. In other words, the

direction of warpage due to temperature change is opposite the direction of warpage due to humidity change..

Rejection of claims under 35 U.S.C. §102(b)

Claims 1, 5, 6 and 10-14 were rejected under 35 U.S.C. §102(b) as being allegedly anticipated by Tajima (JP 2000-311381). As noted above, claim 6 has been cancelled, and the rejection of this claim is moot. As to the remaining claims, the rejection is traversed.

The Office Action again asserts that the embodiments recited in Table 5 of Tajima satisfy the limitations of the instantly claimed invention and that “the data in the tables establishes this.” Applicants respectfully disagree. Table 5 of the Tajima reference recites film thickness, Young's Modulus, Linear Expansion Coefficient and Moisture Permeation Degree. The Tajima reference is *silent* concerning expansion coefficient of humidity.

From the discussion of the Tajima reference *supra*, it will be appreciated that the primary technical goal of the Tajima reference (reducing warpage caused by temperature change) is not readily applicable to the media of the invention, in which warpage due to changes in humidity is controlled by appropriate selection of the expansion coefficient under humidity of the protective film and of the transparent substrate, especially because the Tajima reference discloses media having opposite directions of warpage due to change in temperature and due to humidity change. One of ordinary skill in the art, upon reading the Tajima reference, would not recognize the reference as disclosing the optical recording media as presently claimed.

Tajima neither discloses nor suggests a substrate film or a protective film of an optical recording media which has an expansion coefficient under humidity of less than 5.5×10^{-5} (1%). Moreover, while Tajima does mention variations in camber-angle when humidity is changed, Tajima does not teach or suggest preventing humidity induced warpage or deformation by controlling the magnitude and ratio of the expansion coefficient under humidity of the protective layer or the transparent substrate. The four-layer structure disclosed by Tajima (e.g., in Figure 1) corresponds to a conventional medium as described for Comparative Example 1 of the present

specification, which, as mentioned below, has an expansion coefficient under humidity of $6.25 \times 10^{-5}(1\%)$.

The Examiner also states (at page 3 of the Office Action) that the Comparative Example in the present specification meets the claim limitations (concerning humidity expansion coefficient). This statement is traversed. As Applicants have previously pointed out, all the pending claims recite that the protective film of an optical recording media has an expansion coefficient under humidity of less than $5.5 \times 10^{-5}(1\%)$. The Comparative Example to which the Examiner points describes a protective film having an expansion coefficient under humidity of $6.25 \times 10^{-5}(1\%)$, which is not within the recited range of pending claims 1 and 10 (or the claims dependent therefrom).

The Office Action has also reasserted the argument that “the humidity expansion coefficient is an inherent property of the material and that the protective layer of the prior art cited inherently meets this limitation.” Office Action at page 3. The Office Action goes on to state that

“The examiner notes the materials disclosed in the instant application urethane, epoxy, polyester and polyether acrylates are disclosed as useful and meeting the material limitation of the claims in the instant specification...”

The Examiner appears to take the position that all urethane, epoxy, polyester and polyether acrylates which can be used in optical recording media inherently possess expansion coefficient under humidity values specified in the pending claims. Moreover, the Office Action appears to aver that because warping or tilting in the optical recording media is bad, that any prior art optical recording media which is designed to prevent warp or tilt caused by any stimulus automatically must also satisfy the claim limitations of the instant application.

Applicants do agree that the expansion coefficient under humidity is an inherent property of a material. However, as Applicants have pointed out previously, a mere assertion that a property is inherent is insufficient to prove that a reference is anticipatory. Although Applicants agree that certain urethane, epoxy, polyester or polyether acrylate materials are useful in the present invention, the pending claims further require that each material used in the protective

layer or the transparent substrate possess specified values for the expansion coefficient under humidity. Thus, the instant invention contemplates fabrication of the transparent substrate and protective layer from materials such as urethane, epoxy, polyester or polyether acrylate materials (or polyolefin or polycarbonate) which possess the requisite expansion coefficient under humidity (e.g., as specified in independent claims 1, 10 and 14 and the claims dependent therefrom). While the Examiner states that “urethane, epoxy, polyester and polyether acrylates are disclosed as useful and meeting the material limitation for the protective layer,” Applicants contend that the instant specification does not suggest that all polyester, epoxy, urethane or polyether acrylates are useful in the present invention. Rather, the present specification teaches that those materials meeting *specified limitations* of expansion coefficient under humidity (and in certain claimed embodiments, Young’s modulus) are useful in the claimed invention.

The claimed invention of claims 1, 5, 10-11 and 13-14 provides that the material of the protective film has an expansion coefficient under humidity value greater than that of the transparent substrate and that the expansion coefficient under humidity of the protective film is smaller than 5.5×10^{-5} (1/%). As disclosed by the present specification, optical data recording media which satisfy the above requirements are particularly resistant to deformation or warpage caused by changes in humidity.

It is well-established that a claim is anticipated only if each and every element or feature of a claim is expressly or inherently described in a single prior art reference. See, e.g., MPEP 2131. In the present case, the Examiner appears to agree that the Tajima reference does not expressly disclose all the elements of the presently-claimed invention. For a reference to inherently disclose a feature not expressly disclosed, extrinsic evidence can be used to supply the missing feature only if the extrinsic evidence “make[s] clear that the missing descriptive matter is *necessarily present* in the thing described in the reference and that it would be so recognized by persons of ordinary skill in the art. Inherency, however, may not be established by probabilities or possibilities.” MPEP 2112(IV), citing *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (citations omitted) (emphasis added).

However, the Office Action has not provided any *extrinsic* evidence that the optical recording media of Tajima disclose *all the features* of the claimed invention, or that persons of ordinary skill in the art would recognize that *all the features* of the claimed invention are present in the Tajima reference. See, e.g., MPEP §2131.01, Heading III citing *Continental Can Co. USA v. Monsanto Co.* 20 USPQ2d 1746 (Fed. Cir. 1991).

Tajima neither discloses nor suggests imposing such a performance requirement on the materials used for the optical recording medium recited therein. Moreover, no extrinsic evidence has been presented to show or establish that the protective layers or transparent substrates of the optical recording media of Tajima necessarily possess the expansion coefficient under humidity recited in claims 1, 10 and 14 (and the claims dependent thereupon).

Applicants respectfully submit that the materials disclosed in the Tajima reference do not necessarily possess the properties of the claimed invention. Materials described in similar general terms can and often do have quite different properties, including different expansion coefficient under humidity. It is clear that a reference disclosing a urethane acrylate, epoxy acrylate, or polyester or polyether acrylate would not necessarily provide a disclosure of a material having the claimed expansion coefficient under humidity.

Indeed, Applicants have provided specific evidence to this effect (see the discussion of the Tachibana reference from Applicants' previous response). Applicants further note that amended claims 1, 10, 12 and 14 recite that the protective film is made of an ultraviolet light curing resin. The data provided in Applicants' previous response demonstrated that ultraviolet light curing resins do not all inherently have the properties of the presently-claimed optical recording media. Applicants therefore contend that the inherency rejection cannot be maintained.

Applicants further note that the Examiner does not appear to have specifically addressed claim 12, in which an expansion coefficient under humidity, Young's modulus and thickness of the protective film are suitably adjusted so that the bending moments of the transparent substrate and the protective film generated by change in humidity are balanced with a neutral plane being

a plane perpendicular to the film thickness direction and the position of the neutral plane is arranged within the thin film layer. Applicants respectfully contend that the Tajima reference does not teach or suggest the optical recording medium as claimed in pending claim 12.

In summary, the Tajima reference does not teach or suggest optical recording media which are resistant to deformation or warpage induced by changes in relative humidity. Moreover, the Tajima reference does not teach or suggest that the materials used in the fabrication of the optical recording media should be selected to have low expansion coefficients under humidity or that the expansion coefficient for the protective layer should be greater than that of the transparent substrate.

For at least the reasons discussed herein, Applicants urge that all pending claims are patentable over the Tajima reference. Reconsideration and withdrawal of the rejections is proper and the same is requested.

CONCLUSION


Reconsideration and allowance of claims 1, 5 and 10-14 is respectfully requested in view of the foregoing discussion. This case is believed to be in condition for immediate allowance. Applicant respectfully requests early consideration and allowance of the subject application.

Although no fees are believed to be required with this correspondence. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge Deposit Account No. **04-1105**, under Reference No. 56710 (70801), Customer No. 21874.

Should the Examiner wish to discuss any of the amendments and/or remarks made herein, the undersigned representative would appreciate the opportunity to do so.

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Respectfully submitted,

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